C= COMMODORE 128

Introductory Guide

C= commodore

C= commodore

Introducing the Commodore

128

Personal Computer

CONTENTS

THE COMMODORE 128 PERSONAL COMPUTER

The Commodore 128 Personal Computer is packed with a host of novel and exciting features that make it one of the best performing, most versatile microcomputers available at any price. Among the many impressive features of the Commodore 128 are:

- 128K of memory, expandable to 256K or 512K by using optional RAM expansion modules
- 40 and/or 80 column full color display
- Professional typewriter keyboard with full numeric keypad
- Built-in advanced Basic 7.0 computing language
- Full CP/M Plus Version 3.0 operation
- Complete compatibility with Commodore 64 hardware and software
- Access to over 6000 existing software programs

Not the least of the Commodore 128's virtues is the fact that it is produced by Commodore, the maker of more microcomputers than any other company in the world. As as with all Commodore products, the C128 gives you high performance without high price.

About The Commodore 128 Manuals

There are two books packed with the Commodore 128 computer:

- **INTRODUCING THE COMMODORE 128 PERSONAL COMPUTER**— This is the book you are reading. It gives you all the information you need to know to load prepackaged (commercial) software programs.

- **THE COMMODORE 128 SYSTEM GUIDE**—This is a larger book. It describes the Commodore 128's capabilities in detail. You will want to consult this book if you are an experienced BASIC programmer, or if you are interested in learning how to program in BASIC.

COMMODORE strongly advise you to read the instructions in this manual before setting up or switching on any of the Commodore 128 Personal Computer equipment.

THE THREE C128 OPERATING MODES

The Commodore 128 is, in fact, three computers in one, offering three operating modes:

- **C128 Mode**
- **C64 Mode**
- **CP/M Mode**

The function and use of each of these three modes is summarized below.

C128 MODE

In C128 Mode the Commodore 128 Personal Computer provides 128K of RAM (Random Access Memory). This supplies all the memory needed to run sophisticated applications and integrated software such as JANE. The random access memory can easily be expanded to 256K or 512K using optional RAM expansion modules, further increasing the range of software you can run on the C128.

C128 Mode also incorporates a powerful extended Commodore BASIC language known as BASIC 7.0. This language offers over 140 commands, statements and functions thus providing quick and easy ways to perform complex and time-consuming programming tasks such as graphics, animation, sound and music. C128 Mode also offers both 40 and 80 column output and a 92-key keyboard which features a numeric keypad, Escape, Tab, Alpha Lock and Help keys

This mode also has a built-in machine language monitor, allowing you to create and debug your own machine language programs.

The powerful capabilities of this mode are complemented by the family of new peripheral devices from Commodore, including the 1571 fast disk drive and the 1901 dual monitor which offers both 40 and 80 column displays. The standard Commodore peripherals can also be used with this mode.

C64 MODE

In C64 Mode the Commodore 128 offers all the capabilities of the highly successful Commodore 64, thus allowing you to take full advantage of the wide range of Commodore 64 software already available

In this mode the C128 has full compatability with standard Commodore 64 peripherals including user port and serial devices, cassette recorder, joysticks, composite video monitors and TV output.

C64 Mode provides the BASIC 2.0 language, 40 column output and access to 64K RAM. The keyboard provides all the functions available on a Commodore 64 computer. All the Commodore 64 graphics, color and sound capabilities are present and are used in exactly the same way as they are on the Commodore 64.

CP/M MODE

In CP/M Mode, an onboard Z80 microprocessor gives all the capabilities of Digital Research's CP/M Version 3.0, plus a number of new features added by Commodore. The Commodore 128's CP/M package, called CP/M Plus, provides 128K bytes of RAM, 40 and 80 column output, access to the full keyboard including the numeric keypad and special keys, programmable function keys, and access to the standard peripherals as well as to the 1571, the new fast serial disk drive. There are thousands of applications available for CP/M 3.0 and for other earlier versions of CP/M, such as CP/M 2.0 or CP/M 2.2 These can all be run in CP/M Mode. For example, the already available and proven Perfect Series of software (Perfect Writer, Perfect Calc and Perfect Filer).

40 AND 80 COLUMN DISPLAYS

Two of the C128's modes (C128 and CP/M) allow you to use both 40 and 80 column displays The type of display you require governs the type of monitor you use.

To access the 40 column display, use a composite monitor, e.g. the 1701 or 1702 monitor, a TV set or the 1901 40/80 column dual composite/RGBI monitor. To access the 80 column display, use an RGBI monitor or the 1901 dual monitor. The 1901 dual monitor allows you to switch between 40 and 80 column displays. This can also be achieved by connecting a composite monitor or TV set to the C128 as well as an RGBI monitor.

Note that the 1901 dual monitor must be set to separated chroma/luma for 40 column display. For the 80 column display on that monitor, the video switch must be set to RGBI and the RGBI switch must be set to POS DIGITAL. Full instructions for these settings are given in the 1901 user manual.

UNPACKING THE COMMODORE 128 PERSONAL COMPUTER

The Commodore 128 Personal Computer is supplied in one box which contains the Commodore 128 Personal Computer itself, its power supply, an RF lead, two manuals (this Introductory Guide and the Systems Guide) and the CP/M Systems Disk.

Remove the Commodore 128 Personal Computer carefully from the box and place it on a flat, hard, horizontal surface. Check the contents of the box to ensure that nothing is missing or damaged. If the box or any of the contents are damaged or any of the parts are missing, contact your supplier immediately. Save the boxes in case you need to return the equipment for servicing.

A LOOK AT THE COMMODORE 128

Physically the Commodore 128 resembles a typewriter keyboard. The illustrations below show the location of the switches, sockets and ports by which the C128 is turned on and off and connected to the other pieces of equipment in the system, e.g. disk drive, monitor.

CONTROL PORTS 1 & 2

RESET SWITCH

POWER SOCKET

ON/OFF SWITCH

RF SOCKET

RGBI SOCKET

USER PORT

VIDEO SOCKET

SERIAL SOCKET

CASSETTE PORT

EXPANSION PORT
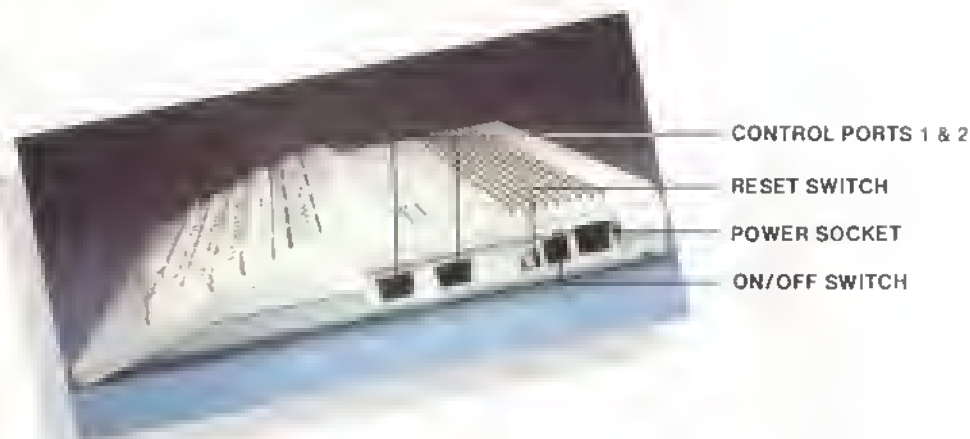
KEYBOARD NOTES

On the C128 keyboard some keys function in all three modes of the computer. Other keys can only be used in a particular mode or modes. The diagram below shows the different areas of the keyboard. Keys in the shaded areas (the Main Keyboard and the Function Keys) work only in C64 Mode. They correspond to the keys on the Commodore 64 and function in C64 Mode exactly as the keys on a Commodore 64 do. In C128 Mode and CP/M Mode all the keys function. Note that if a key is pressed and that key does not function in the C128's current mode, that key is ignored.

The Numeric Keypad and the two sets of Special Function Keys are operative only in C128 Mode and CP/M Mode. The Enter key on the Numeric Keypad functions in the same way as the Return key on the Main Keyboard.

The 40/80 key is used to select the required screen display. When this key is in its raised position 40 column display is selected, in its depressed position 80 column display is selected. It is changed from its raised to depressed position, and vice versa, by pressing it once

C-64 MODE
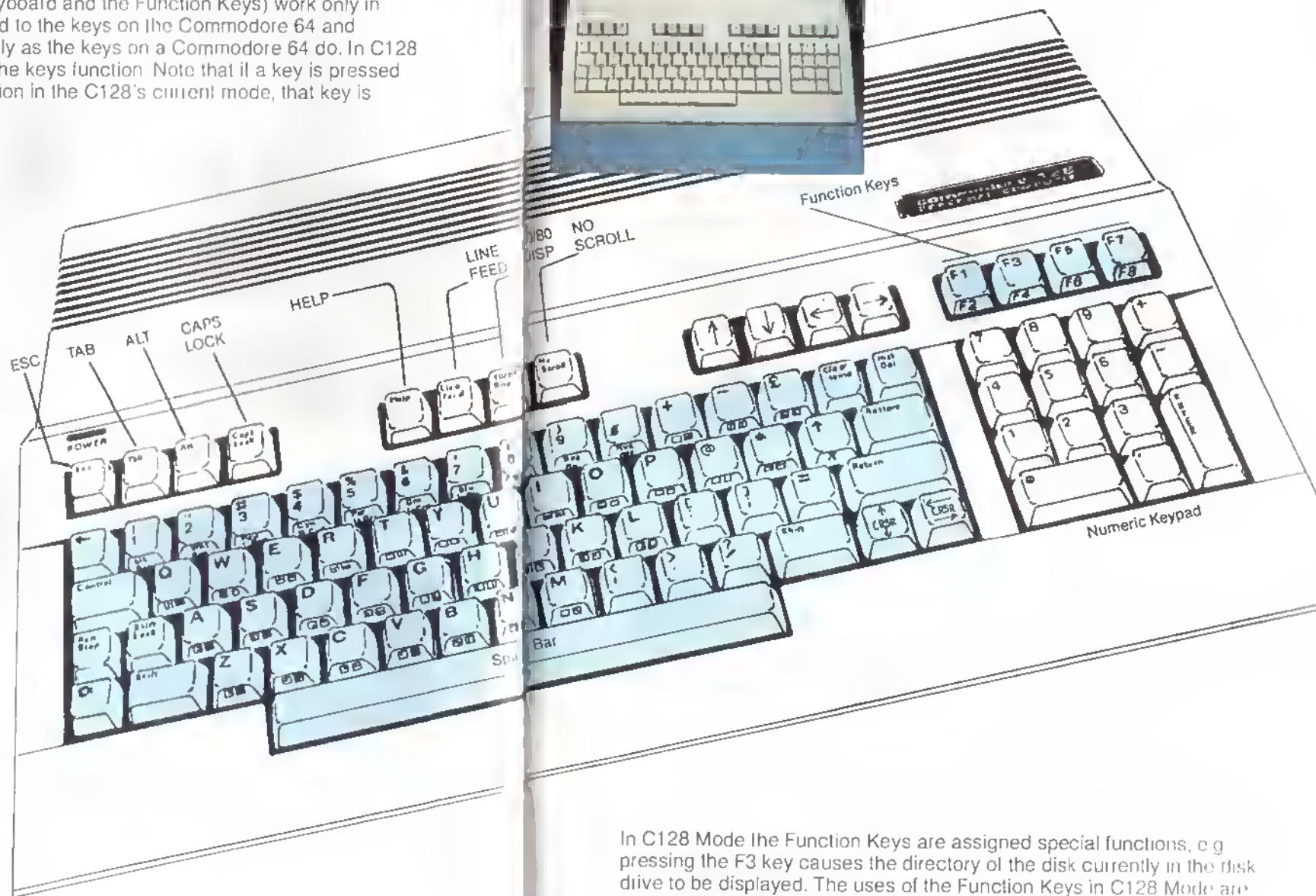
In C128 Mode the Function Keys are assigned special functions, e g pressing the F3 key causes the directory of the disk currently in the disk drive to be displayed. The uses of the Function Keys in C128 Mode are given in Chapter 2 Section 5 of the System Guide

DOCUMENTATION AND DISKS

Brief descriptions the documentation and disks supplied with the
Commodore 128 are given here.

Introductory Guide

The Introductory Guide (this manual) is a basic guide describing the
equipment, how to set it up and connect it. It also describes the three
modes available on the Commodore 128 Personal Computer and gives
instructions on how to access and use them.

System Guide

The System Guide provides you with all the information you need to create
and run your own programs in all three of the Commodore 128's modes. It
describes the Commodore 128 in detail and is designed to help you make
full use of its advanced capabilities.

The CP/M Systems Disk

This disk contains the CP/M operating system software together with an
extensive HELP utility program. This software is loaded into the computer's
memory when CP/M software is to be run or any other operations are to
be carried out under that operating system.

SETTING UP THE EQUIPMENT

The minimum system for using the Commodore 128 Personal Computer is
the C128 itself, a suitable monitor or TV set and a 1541 or 1571 disk drive.
If you intend to use C64 Mode with cassette based software only, the disk
drive can be replaced by a cassette unit.

Following the instructions on the label on the C128 mains power lead,
connect a plug to that lead if one is not already fitted. The other end of that
lead is plugged into the Power Socket on the side of the C128.

If you are using a monitor it is supplied with a suitable lead for connecting
it to the computer and a user manual giving instructions for connecting the
monitor to the computer.

Connecting a composite monitor

A composite monitor, such as
the Commodore 1702, provides
a 40 column color display. Plug
the lead into the Video Socket
on the rear of the computer.

Connecting an RGBi monitor

An RGBI monitor provides an 80 column color or monochrome display. A special 80 column monitor is used because the picture on most TV sets and composite monitors does not have the sharpness or resolution needed to handle an 80 column display. Plug the RGBI monitor into the 9 pin RGBI Socket on the rear of the computer and tighten the two screws on the plug to secure it.

Connecting a dual monitor

A dual monitor, such as the Commodore 1901, provides both 40 and 80 column displays. It is supplied with two cables one of which is plugged into the Video Socket and the other into the RGBI Socket. Both of these sockets are on the rear of the computer. When you have inserted the D plug into the RGBI Socket, tighten the screws on that plug to secure it.

Note that you can connect a composite monitor and an RGBI monitor to the Commodore 128 at the same time. This allows you to switch between 40 and 80 column displays.

Connecting a Television Set

If you are using a TV set, use the RF lead supplied with the C128. One end of that lead has an aerial plug on it. Insert that plug into the aerial socket of your TV set and the other end into the RF Socket on the rear of the computer.

Connecting to a Serial Socket

Both the 1541 and 1571 disk drives are supplied with a serial lead which has a five pin DIN plug on each end. One end of this lead is inserted into the serial socket on the rear of the disk drive as described in the user manual for the disk drive. The other end is inserted into the Serial Socket on the rear of the C128.

SWITCHING ON

Plug the monitor, C128 and disk drive into the mains power supply.

When you switch on your C128 for the first time, use C128 Mode to test that all the equipment works correctly

If you are using a TV set, a composite monitor, e.g. the 1701, or a 1901 dual monitor, ensure that the 40/80 key is in the 40 column position (not depressed). If this key is depressed, press it once to release it to its raised position. If you are using a 1901 dual monitor, set it to separated chroma/luma. This is described in the 1901 user manual.

If you are using an RGBI monitor, ensure that the 40/80 key is in the 80 column position (depressed) If this key is in its raised position, press it once to depress it.

Switch on the monitor as described in the monitor user manual. The C128 is switched on by setting the On/Off Switch on the side of the computer to the ON position.

The Power Indicator Light is then illuminated and the following messages are displayed:

The READY. message then appears with the cursor, the flashing square block, below this. The computer is now in C128 Mode. The disk drive can then be switched on as described in the user manual for that piece of equipment.

If there is no picture, adjust the monitor display according to the instructions given in the user manual for that monitor. If you are using a TV set, it must be tuned to the frequency of the C128. If you then cannot obtain a picture or the correct messages are not displayed, switch the computer off and then on again. If the computer still fails to work correctly consult your dealer.

The Trouble Shooting Chart shown on the following pages lists some of the more common problems and tells you how to correct them.

WARNING

NEVER block the ventilation slots on the top of the computer. Doing so causes overheating which may result in system failure.

NEVER place fluids on or near the computer. Liquid spilled into the computer causes it to fail.

TROUBLE-SHOOTING CHART

Symptom	Cause	Remedy
Indicator light not 'ON'	Computer not turned ON	Make sure power switch is in ON position
	Power supply not plugged into computer	Check power socket for loose or disconnected power cable. Unplug from mains supply first!
	Power supply not plugged into mains power supply	Check connection with mains power supply
	Bad fuse in power supply	Replace fuse. Unplug first!
No picture (Monitor)	Monitor not connected	Check monitor connections
	40/80 column setting incorrect	Check 40/80 column switch on computer and/or monitor
No picture (TV)	Incorrect connection	Check computer connection to TV
	Cable to TV not plugged in	Check output cable connection to TV
	Computer and/or TV set for wrong channel	Re-tune TV
	40/80 key setting incorrect	Turn off computer. Set 40/80 key to UP position for TV
Random pattern on screen with cartridge in place	Cartridge not properly inserted	Turn power OFF and reinsert cartridge

Symptom	Cause	Remedy
Picture with poor or no color	Poorly tuned color controls	Adjust color controls on TV or monitor
Sound with excess background noise	Volume too high	Adjust volume
Picture OK, but no sound	Volume too low	Adjust volume
	AUX input on external amplifier not properly connected	Connect sound jack to AUX input on amplifier and select AUX input
Computer stuck: Cursor not flashing	Computer inadvertently received instructions to disable keyboard; or the printer, cassette or disk drive is in listening mode	While depressing the RUN/STOP key press RESTORE key twice; or reset the peripherals by turning off and on; or turn the computer off and on
	Incorrect operating mode setting for monitor	Press ESCAPE key; release, press X
Computer displays garbled symbols on the screen	CAPS LOCK key depressed	Release CAPS LOCK key
	Overheating	Unplug from mains power supply and allow to cool down (make sure air flow around power supply is not restricted)

Appendices A and B of the System Guide list the error messages for the Commodore 128.

PERIPHERALS

In addition to the TV set or video monitor used for the display, you can connect many other accessories (peripherals) to your computer. Peripherals increase the range of functions you can carry out with your Commodore 128 For example, with the correct peripherals you can use the Commodore 128 to access stock market quotes or airline schedules and print out a copy for reference - all without leaving your home or office. The following describes some of the most popular peripherals and how to connect them to the Commodore 128.

Disk Drives

A disk drive allows you to save and recall information. This information is held on storage devices called disks. Thousands of prepackaged programs are available on disk, programs covering almost all conceivable subjects, e.g. education, business, music, drawing, communications Disk drives are fast and easy to use Only one cable is required to connect the disk drive to the Commodore 128 This is inserted into the Serial Port on the rear of the computer.

Printer

A printer provides a printed copy ("hard copy") of information that is either contained in the computer, or stored on disk or cassette tape. With a printer you can produce letters, reports, mailing labels, etc If you use a printer with graphic capabilities, you can also produce pictures A Commodore printer can be connected in more than one way You can either connect it directly to the computer's Serial Port, or you can "chain" it to a disk drive connected to the Serial Port of the computer


Modem

A modem allows you to use your computer to communicate through telephone lines with other computers and with information services such as Compunet and View Data Systems Information received through your modem can be saved on a disk or tape, or it can be printed out The modem is connected to the Commodore 128 through the Expansion Port on the rear of the computer

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Datassette Recorder

A Commodore 1530 cassette recorder, called a Datassette, is an inexpensive way of storing and recalling information. The Datassette lead is inserted into the Cassette Port on the rear of the Commodore 128.
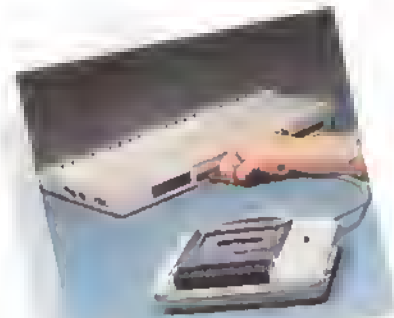
Joysticks/Mouse

Joysticks plug into the Control Ports on the right hand side of the computer. Once used primarily for games, joysticks are now increasingly being used for educational and business software. Joysticks designed for the Commodore 64 are compatible with the Commodore 128.

A mouse is plugged into either of the Control Ports and allows you to move the cursor easily from place to place on the screen. Many programs display a list of choices (called a menu) on the screen. With a mouse you can select from the menu without using the keyboard.

Chaining Disk Drives and Printers

You can use the "chaining" (or "daisy chaining") technique to connect several disk drives or printers to your Commodore 128. Using this technique you connect a cable from one serial port of a printer or disk drive to the serial port of another disk drive. A disk drive must be the item of equipment directly connected to the Commodore 128's Serial Port. The connection diagram shows a printer and a disk drive connected to the computer by chaining.

Checking the Connections

Check the connection of your equipment against the connections shown in the diagram below. Note that this diagram shows a typical setup for a Commodore system using a dual monitor. Connection details may vary for different models of equipment, you must, therefore, be sure to refer to the manuals included with any peripheral equipment you purchase.

mains power

mains power

mains power
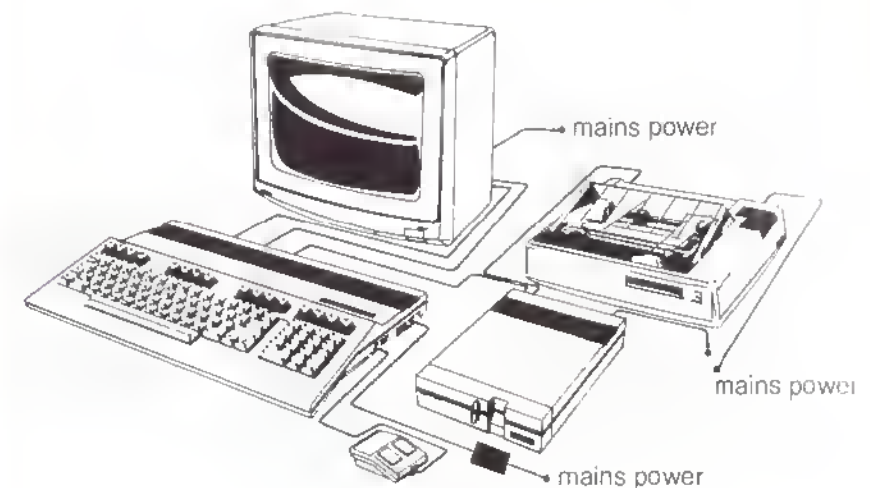
THE THREE OPERATING MODES

Each of the three operating modes of the Commodore 128 takes advantage of particular hardware and software features. A description of each mode is given below, together with instructions for selecting that mode when the computer is switched on and, where applicable, from C128 Mode.

Two of the modes (C128 and CP/M) allow you to use both 40 and 80 column displays. The type of monitor for the required screen display is discussed on page 3. The 40 column display is selected by setting the 40/80 key to its raised position; the 80 column display is selected by setting the 40/80 key to its depressed position.

The Commodore 128 Personal Computer is switched on by setting the On/Off Switch on the side of the computer to the ON position.

Pressing the Reset Switch causes the initial screen for C128 Mode to reappear. The initial screen is the display which appears on the screen when that mode is first entered. In the case of CP/M Mode, pressing the Reset Switch causes CP/M Plus version 3.0 to reboot from the CP/M Plus System Disk.

WARNING

PRESSING THE RESET SWITCH OR SWITCHING OFF THE COMPUTER OESTROYS ANY INFORMATION IN THE COMPUTER'S MEMORY UNLESS THAT DATA IS FIRST SAVED.

C128 MODE

C128 Mode is the default mode of the Commodore 128 Personal Computer This means that, when you switch on the computer without any keys being held down and with the disk drive switched off, C128 Mode is entered This mode supports both 40 and 80 column displays.

C64 and CP/M modes can be entered from C128 mode without switching the computer off or resetting it Instructions for this are given in the descriptions of those modes

To Enter C128 Mode When Switching On The Computer

To select 40 column display:

- Make sure that you are using a TV set, a composite monitor, or a 1901 dual monitor
- If you are using the 1901 dual monitor, ensure that it is set to separated chroma/luma (this is described in the 1901's user manual)
- Make sure the 40/80 key is NOT depressed
- Switch the disk drive off
- Switch the computer on
- Switch the disk drive on
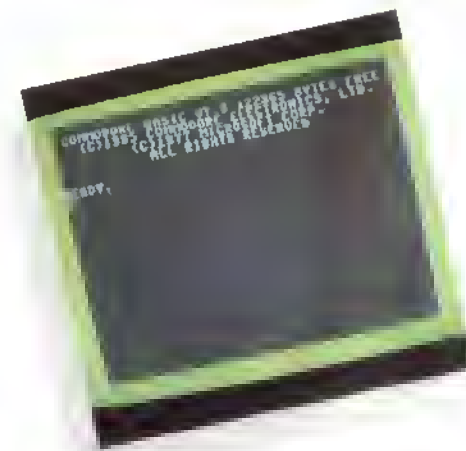
To select 80 column display:

- Make sure that you are using an RGBI monitor or a 1901 dual monitor
- If you are using the 1901 dual monitor, ensure that it is set to RGBI on the video switch and POS DIGITAL on the RGBI switch (see the 1901's user manual)
- Make sure that the 40/80 key is depressed
- Switch the disk drive off
- Switch the computer on
- Switch the disk drive on

To enter C128 Mode from CP/M Mode, the computer must first be switched off. The above instructions are then followed to switch it on again in C128 Mode. To enter C128 Mode from C64 Mode, press the Reset Switch.

Switching Between 40 And 80 Columns in C128 Mode

If you are using an RGBI monitor together with a TV set or composite monitor, or if you are using the 1901 dual monitor, you can switch between 40 and 80 column displays. To do this, press the ESC key and then the X key. If you are using the 1901 dual monitor, set this to the correct setting for the screen mode you have selected.

The Function Keys

Each of the Function Keys in the top right of the keyboard has a special use in C128 Mode. These uses are listed briefly here. They are described fully in Chapter 2 Section 5 of the System Guide.

F1 Enter one of the GRAPHICS modes
F2 Prints the disk load command (DLOAD") on the screen
F3 Lists the directory of the disk currently in the disk drive
F4 Clears the screen
F5 Prints the disk save command (DSAVE") on the screen
F6 RUNs the program currently in the computer's memory
F7 LISTs the program currently in the computer's memory
F8 Enters the machine language monitor

All of the function keys can be redefined (reprogrammed to perform another function).

Leaving C128 Mode

Leave C128 Mode either by removing the disks from the disk drive and switching off the computer, or by entering CP/M Mode or C64 Mode. Instructions for entering CP/M Mode and C64 Mode are given on the following pages.

WARNING

LEAVING C128 MODE AND ENTERING CP/M MODE OR C64 MODE DESTROYS ANY INFORMATION IN THE COMPUTER'S MEMORY UNLESS THAT DATA IS FIRST SAVED.

C64 MODE

In C64 Mode the C128 behaves exactly as if it is a Commodore 64 computer. In this mode, Commodore 64 software in cartridge, disk or tape format, can be run and all the standard Commodore 64 peripherals can be used. Note that the screen display in C64 Mode is 40 columns only.

There are three methods of entering C64 Mode:

- With the power off, hold down the ☾ key and switch the computer on. The ☾ key is in the bottom left corner of the keyboard. When the computer is switched on, the Commodore 64 initial screen appears.
- With the computer in C128 Mode and in BASIC 7 0 type GO64 and press RETURN The message "ARE YOU SURE?" is displayed. Type Y and press RETURN The Commodore 64 initial screen then appears.
- With the computer switched off, insert a Commodore 64 software cartridge into the Expansion Port and switch on the computer. The program in the cartridge is automatically loaded and run.
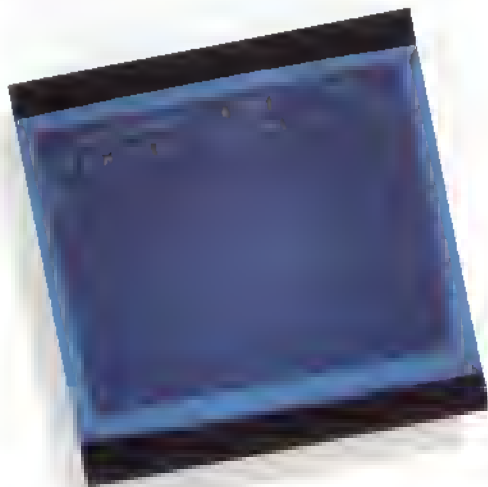
WARNING

NEVER INSERT OR REMOVE A CARTRIDGE WHEN THE COMPUTER IS SWITCHED ON. DOING SO MAY DAMAGE BOTH THE COMPUTER AND THE CARTRIDGE.

Leaving C64 Mode

To leave C64 Mode, switch the computer off. Note that the computer MUST be switched off before a cartridge is removed from the C128's Expansion Port. If you wish to access another mode and/or run a different piece of software the cartridge must be removed from the computer before it is switched on again.

CP/M MODE

CP/M Plus version 3.0 is a popular operating system for microcomputers. It was developed by Digital Research Incorporated (DRI). Like all operating systems, CP/M Plus is a set of instructions which tell the computer how to manage all the hardware and software elements of the system, such as memory, disk storage, screen, keyboard and printer

This mode supports both 40 and 80 column displays. Software available for earlier versions of CP/M, such as CP/M 2.0 or CP/M 2.2, can also be run on the C128 in CP/M Mode.

A manual giving a detailed description of how to use CP/M Plus is available Information about how you can obtain a copy is given on a coupon enclosed in the box in which the C128 computer is supplied.

CP/M Mode can be entered either when switching on the computer, or from C128 Mode.

To Enter CP/M Mode When Switching On The Computer

To select 40 column display:

- Make sure that you are using a TV set, a composite monitor, or a 1901 dual monitor
- If you are using the 1901 dual monitor, ensure that it is set to separated chroma/luma (this is described in the 1901's user manual)
- Make sure the 40/80 key is NOT depressed

To select 80 column display

- Make sure that you are using an RGBI monitor or a 1901 dual monitor

- If you are using the 1901 dual monitor, ensure that it is set to RGBI on the video switch and POS DIGITAL on the RGBI switch (see the 1901's user manual)

- Make sure the 40/80 key is depressed

When you have ensured that you have the correct conditions for the required display:

- Turn on the disk drive
- Insert the CP/M Plus 3.0 System Disk
- Turn on the computer
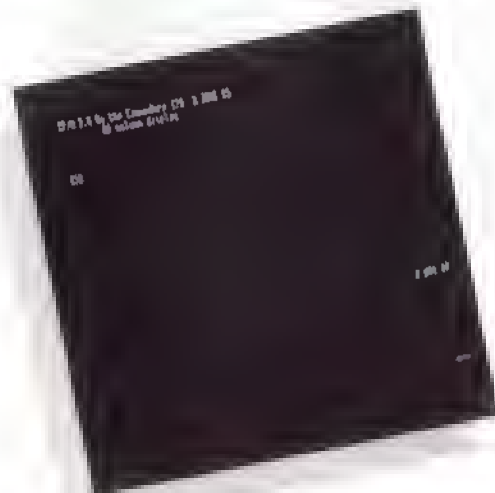
CP/M Plus 3.0 is then booted (loaded) into the computer. After the initial display, the CP/M prompt A> appears. This tells you that CP/M Plus is ready to accept commands entered through the keyboard.

NOTE

The disk drive **MUST** be switched on **before** switching on the computer when booting CP/M Plus into the computer.

Entering CP/M Mode From C128 Mode

- Select the required display (40 or 80 columns) using the 40/80 key

- Ensure that you are using the correct monitor for the display you have selected, or that the 1901 dual monitor is set up correctly for the use (the 1901's user manual)

- Ensure that the disk drive is switched on

- Insert the CP/M Plus 3.0 System Disk into the disk drive

- Type BOOT and press RETURN

CP/M Plus 3.0 is then booted (loaded) into the computer. After the initial display, the CP/M prompt A> appears. This tells you that CP/M is ready to accept commands entered through the keyboard.

Switching Between 40 And 80 Columns in CP/M Mode

If you are using an RGBI monitor together with a TV set or composite monitor, or if you are using the 1901 dual monitor, you can switch between 40 and 80 column displays. To do this, set the 40/80 key to the required number of columns. If you are using the 1901 dual monitor, set this to the correct setting for the display you have selected (see the 1901's user manual). Ensure that the disk drive is switched on, that the CP/M Plus System Disk is in the drive and then press the Reset Switch. CP/M Plus 3.0 is rebooted

Note that using this method destroys any information in the computer's memory unless that data is first saved

Leaving CP/M Mode

To leave CP/M Mode, remove the CP/M Plus System Disk from the disk drive and switch off the computer. C64 Mode can then be selected as described on page 24. To leave CP/M Mode and enter C128 Mode, remove the CP/M Plus System Disk from the disk drive and press the Reset Switch

MODE SWITCHING CHART

FROM / TO	OFF	C128 40 COL	C128 80 COL	C64	CP/M 40 COL	CP/M 80 COL
C128 40 COL	1. Check that 40/80 key is UP 2. Turn computer ON		1 Press ESC key release 2 Press X key **OR** 1 Check that 40/80 key is UP 2 Press RESET button	1 Check that 40/80 key is UP 2 Turn computer OFF, then ON	1 Check that 40/80 key is UP 2 Turn computer OFF then ON	1 Check that 40/80 key is UP 2 Turn computer OFF, then ON
C128 80 COL	1 Press 40/80 key DOWN 2 Turn computer ON	1 Press ESC key release 2 Press X key **OR** 1 Press 40/80 key DOWN 2 Press RESET button		1 Press 40/80 key DOWN 2 Turn computer OFF then ON	1 Check that 40/80 key is DOWN 2 Remove CP/M system disk from drive, if necessary 3 Turn computer OFF then ON	1 Check that 40/80 key is DOWN 2 Remove CP/M system disk from drive, if necessary 3 Turn computer OFF, then ON
C64	1 Hold C key DOWN 2 Turn computer ON **OR** 1 Insert C64 cartridge 2 Turn computer ON	1 Type GO 64 press RETURN. 2 The computer responds ARE YOU SURE? Type Y, press RETURN.	1 Type GO 64 press RETURN 2 The computer responds ARE YOU SURE? Type Y, press RETURN		1 Turn computer OFF 2 Check that 40/80 key is UP 3 Hold DOWN C key while turning computer ON **OR** 1 Turn computer OFF 2 Insert C64 cartridge 3 Turn power ON	1 Turn computer OFF 2 Check that 40/80 key is UP 3 Hold DOWN C key while turning computer ON **OR** 1 Turn computer OFF 2 Insert C64 cartridge 3 Turn power ON
CP/M 40 COL	1 Turn disk drive ON 2 Insert CP/M system disk in drive 3 Check that 40/80 key is UP 4 Turn computer ON	1 Turn disk drive ON 2 Insert CP/M system disk in drive 3 Check that 40/80 key is UP 4 Type BOOT 5 Press RETURN	1 Turn disk drive ON 2 Insert CP/M system disk in drive 3 Check that 40/80 key is UP 4 Type BOOT 5 Press RETURN	1 Check that 40/80 key is UP 2 Turn disk drive ON 3 Insert CP/M system disk in drive 4 Turn computer OFF, then ON		1 Insert CP/M utilities disk in drive 2 At screen prompt, A> type. DEVICE CONOUT = 40COL 3 Press RETURN.
CP/M 80 COL	1 Turn disk drive ON 2 Insert CP/M system disk in drive 3 Press 40/80 key DOWN 4 Turn computer ON	1 Turn disk drive ON 2 Insert CP/M system disk in drive 3 Press 40/80 key DOWN 4 Type BOOT 5 Press RETURN	1 Turn disk drive ON 2 Insert CP/M system disk in drive 3 Check that 40/80 key is DOWN 4 Type BOOT 5 Press RETURN	1 Press 40/80 key DOWN 2 Turn disk drive ON 3 Insert CP/M system disk in drive 4 Turn computer OFF then ON	1 Insert CP/M utilities disk in drive 2 At screen prompt A> type DEVICE CONOUT = 80COL 3 Press RETURN.	

NOTE: If you are using a Commodore 1901 dual monitor, remember to move the video switch on the monitor from COMPOSITE or SEPARATED to RGBI when switching from 40-column to 80-column display, reverse this step when switching from 80 to 40 columns. Also, when switching between modes remove any cartridges from the expansion port and any disks from the disk drive.

LOADING AND RUNNING SOFTWARE

Applications software is loaded into the Commodore 128 Personal Computer after the required mode (C64, C128 or CP/M) is selected. There is a wide range of software available for the Commodore 128 computer including thousands of CP/M programs and the complete range of Commodore 64 software. Refer to the user's manual supplied with the software for instructions on how to load and use the software.

Software is supplied on one or more of three different media, disk, cartridge or cassette tape. Each of these three media is described below

DISK

Disks are also called diskettes or floppy disks. They provide fast and easy storage and retrieval for your information and programs. A disk drive, such as the Commodore 1541 or 1571, is required in order to load and run disk based software.

Disks must be handled with care. The following rules must be obeyed in order to protect the information stored on your diskettes:

1. Keep the diskette in its storage envelope whenever it is not in the drive unit.

2. Store the diskette in a diskette library case or other suitable rigid container.

3. NEVER leave the diskette on top of the drive unit.

4. Keep diskettes away from magnets and magnetic fields such as those generated by transformers, electronic motors, loudspeakers and telephone bells.

5. Do not write on the diskette jacket or label with a lead pencil or ball-point pen. Use a felt-tip pen or fill out the label before attaching it to the diskette.

6. Do not expose diskettes to excessive heat or sunlight. The recommended temperature range for the storage and use of diskettes is 50-120°F or 10-50°C.

7. Do not touch the diskette surface or centre hole, hold only the encased area

8. Do not attempt to clean the diskette. Abrasion results in the loss of stored information

9. Do not turn the drive unit on or off while the diskette is in place.

10. Gently load the diskette into the drive unit. Rough handling or forcing may damage the centre hole

11. Do not remove the diskette while the program is loading

12. Never remove the diskette from the drive unit while the drive-active indicator light is lit or while the disk unit is whirring

13. Never bend the diskette. Always keep it flat.

14. Do not attach notes to the diskette with a paper clip or staples.

Software for all three of the C128's modes (C128, C64 and CP/M) is supplied on disk.

Inserting a Disk Into The Disk Drive

To load disk based software into the computer, the disk containing the software must first be inserted into the disk drive. To do this remove the disk from its storage envelope, hold it with the label up and towards you and insert it horizontally into the disk drive.

When the disk is fully inserted into the disk drive, close the disk drive door or turn the lever from its horizontal position to its vertical position.

The program can now be loaded from the disk into the computer's memory. Instructions for doing this are given in the manual provided with the software.

Formatting a Disk

Before a disk can be used to store information or any of your own programs, it must be formatted. The way in which this is carried out depends on the current mode of the C128. The following gives the locations in the System Guide where the formatting instructions are given for each mode:

C128   Chapter 2 Section 3
C64   Chapter 3 Section 10
CP/M   Chapter 4 Section 12

Saving And Loading Your Own Programs

In C128 and C64 modes you can SAVE onto disk programs that you have created yourself. These programs can then, at a later date, be LOADed into the computer and RUN. To save a program onto disk, insert a previously formatted disk into the disk drive, close the disk drive door and type:

SAVE"programname",8

where programname is the name you assign to your program. This is a maximum of 16 alphabetic and numeric characters. When this is as you wish, press the **RETURN** key. The disk drive active light is then illuminated and the message:

SAVING programname

is displayed. When this is complete the "READY." message reappears with the cursor below it.

When you wish to use this program again, or make amendments to it, load it into the computer's memory by inserting the disk on which you SAVEd it into the disk drive and typing:

LOAD"programname",8

The program name must be exactly as you specified it when you SAVEd the program. When this is as you wish, press RETURN. The disk drive active light is illuminated and the message:

LOADING programname

is displayed. When this is complete, the **READY.** message is displayed with the cursor below it. The program can now be run or amended as you require. To run the program type:

RUN

and press **RETURN.**

In C128 Mode the SAVE and LOAD commands can be replaced by the DSAVE and DLOAD commands. In this case, the ,8 is omitted from the end of the instruction. C128 Mode has "shorthand" methods for entering these two commands on the screen. Pressing F5 causes DSAVE" to put displayed on the screen, and pressing F2 causes DLOAD" to be displayed on the screen. You then enter the name of your program and press **RETURN.** Your program is then SAVEd to disk, or LOADed from disk, as appropriate.

CARTRIDGE

Cartridge software is software stored in ROM (read only memory) which is housed in a rigid plastic casing. The cartridge is slotted into the Expansion Port on the rear of the C128. To do this, first switch off the computer. Then hold the cartridge with the label side uppermost and insert its open end firmly into the Expansion Port. DO NOT force the cartridge.

When the cartridge is in place switch on the computer. The program is then automatically loaded into the computer's memory. If the screen display is scrambled, switch the computer off, press the cartridge firmly into the Expansion Port and switch the computer on again.

Note that you MUST switch the computer off BEFORE removing the cartridge.

WARNING

NEVER INSERT OR REMOVE A CARTRIDGE WHEN THE COMPUTER IS SWITCHED ON. DOING SO MAY DAMAGE BOTH THE COMPUTER AND THE CARTRIDGE.

Cartridge software is supplied for C128 Mode and C64 Mode.

CASSETTE

Cassette tape software is software stored on standard size cassette tapes similar to audio cassette tapes. Information (data and programs) is read from and stored on cassette tape using a datassette (the Commodore cassette recorder). The datassette plugs into the Cassette Port on the rear of the C128.

Only software for the C128 and C64 modes is available on cassette tape.

Loading And Running CP/M Software

In order to run CP/M software on the C128, the CP/M Plus 3.0 operating system must first be loaded into the computer, i.e. the C128 must be in CP/M Mode. This is described on page 25.

When the C128 is in CP/M Mode, remove the CP/M Plus System Disk from the disk drive and store it in a safe place. Then insert the required CP/M program disk into the disk drive and close the disk drive door. Type in the program name as given in the user manual for that piece of software, and press RETURN. You then follow the instructions given on the screen or in the user manual for that software.